

Amendments to the Specification:

Please replace on page 1 lines 4 through 5 with the following paragraph:

This application claims the benefit under 35 U.S.C. 119(e) of United States Provisional Patent Application Serial No. 60/181,823 filed on February 11, 2000.

Please replace the paragraph on page 3 lines 3 through 7 with the following paragraph:

A computer system 114, located outside the RF shielded room 100, operates the MRI machine through the front end controller 128 via an acquisition interface 124. A user requesting specific imaging information via acquisition commands mans the computer system 114. The processed data is sent to the viewing section 116 on the console 118. Here the user can display the images on the monitor 120 and/or can reproduce them on a hard copy camera 122.

Please add on page 3 after line 7 the following paragraph:

The Magnetic Resonance Imaging system includes a magnetic field gradient coupler 148 which comprises a control system and power supply 150, x-gradient element 152, y-gradient element 154 and z-gradient element 156.

Please replace the paragraph starting on page 3 line 27 with the following paragraph:

To do a targeted scan relevant patient statistics are first entered into the administration section on the console 118. The system is then instructed to do the required scan, including the geometrical parameters, the imaging method, and the sequence timing. (For new or experimental imaging the gradient field strength as a function of time for each direction x, y and z and the RF waveform must first be programmed into the memory of the computer system 114. This can also be done on the console 118.) The information is then forwarded to an operational area of the machine known in general as the "spectrometer." The spectrometer 126 consists of the front-end-controller 128 (controlling the magnet, gradients, RF transmitter and receiver, RF coil switches, etc.) and the data acquisition around the receiver (the receiver switches and the ADC (analog-to-digital converter)) 130 which is coupled to the pre-amplifier 140 through a mixer 144.

Please replace on page 18 under equation (4.10) which is line 10 with the following:

where $[[a]]_{\alpha}$ is a normalization constant and $\sigma_{\alpha} = \delta_{ij} \Sigma$, i.e., only the diagonal elements of Σ .

Please replace on page 22 the last full paragraph lines 10 through 22 with the following paragraph:

In the Bayesian method the optimal values of the input parameters as well as the parameter of interest are determined as part of the calculation. The input values are used only as an initial guess to start the algorithm. The flexibility of being able to adjust the parameters in accord with the actual experimental data is a decided advantage over the use of predetermined, fixed parameters employed by current methods in use such as with the matched filter method. Moreover, as was pointed out earlier the values of the parameters may be improved upon by the addition of a new knowledge of the physical situation in the form of empirical and/or theoretical models that may include features such as boundary conditions or perturbations. The Bayesian method is a dynamic and unique method for parameter estimation, and prior to this disclosure has not been applied to MRI flow measurements. A summary flow chart of the methodology just described is shown in Fig.2. MRI data 200, an MRI model function $f(\alpha)$ and prior information 204 are processed utilizing Bayesian methodology 206 to image the feature of interest α 208. This feature of interest α 208 is utilized in a clinical application 210 to make a medical decision 212.